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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,919	07/13/2001	Michael E. Mack	11460-112	4702

26486 7590 03/31/2003

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EXAMINER

NGUYEN, LAM S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/904,919

Applicant(s)

MACK ET AL

Examiner

LAM S NGUYEN

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2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 9-15, 18, 21-31 and 33-35 is/are rejected.
- 7) ☒ Claim(s) 4-5, 7-8, 16-17, 19-20, 32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-3, 6, 9-15, 18, 21-31, 33-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Bakker (US 634683).

Bakker discloses an apparatus for gas cluster ion beam (GCIB) mass or cluster size diagnostics for improving GCIB workpiece processing, comprising:

a vacuum vessel (FIG. 1, element 5);

a gas cluster ion beam source within the vacuum vessel for producing a gas cluster ion beam (FIG. 1, element 1);

an accelerator for accelerating the gas cluster ion beam along a trajectory (FIG. 1, elements a1-a3);

a beam gate for controllably interrupting and restoring the gas cluster ion beam (FIG. 2, element s1);

beam current measurement means (Column 7, line 19-20) disposed along the trajectory at a predetermined distance, L (FIG. 2, element L), from said beam gate;

control means for providing beam gating/deflecting signals to said beam gate/deflector that controllably interrupt and restore the gas cluster ion beam (FIG. 1: a corresponding control means for controlling the deflection of element s1);

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time-of-flight measurement means for measuring the times-of-flight of components of the gas cluster ion beam over said distance, L (column 7, line 14-22 and FIG. 2, element L); and

a time-of-flight analyzer to analyze said times of flight of components of the gas cluster ion beam in order to provide output information relative to GCIB mass or cluster size (column 7, line 14-22) wherein said output information is used in the gas cluster ion beam processing.

workpiece holding means disposed along the trajectory for holding a workpiece for gas cluster ion beam processing (FIG. 1, element 25).

**Referring to claims 2, 14, 26:** further comprising display means for displaying the times-of-flight of components of the gas cluster ion beam (FIG. 1, element 6).

**Referring to claims 3, 33-35:** wherein the time-of-flight analyzer calculates the size or mass distribution of components of the gas cluster ion beam (column 7, line 14-21), and the apparatus further comprises display means for displaying the size or mass distribution of the components of the gas cluster ion beam (FIG. 1, element 6).

**Referring to claims 6, 15, 18:** wherein the time-of-flight analyzer calculates the size-to-charge-ratio distribution of components of the gas cluster ion beam, and the apparatus further comprises display means for displaying the mass-to-charge-ratio of the components of the gas cluster ion beam (column 7, line 14-22).

**Referring to claims 9, 21:** wherein the beam current measuring means comprises a faraday cup for collecting beam current signals (FIG. 1, the element covers elements 23-26).

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**Referring to claims 10, 22:** wherein the accelerator accelerates the gas cluster ion beam to a known energy in the range of from about 1 keV to about 50 keV (FIG. 1, element 10: 3.5 keV).

**Referring to claims 11, 13, 28-30:** wherein the beam gate/deflector switches the beam on or off or from the first trajectory to the second trajectory during a time that is shorter than the time-of-flight of the gas ion beam clusters of mean mass as they travel said distance, L (FIG. 2).

**Referring to claim 31:** wherein the processing step further comprises the step of taking a derivative of the current transient after time t (column 7, line 36: detecting current in time).

*Allowable Subject Matter*

2. Claims 4-5, 7-8, and 16-17, 19-20, 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Referring to claims 4, 7, 16, and 19:** The most pertinent art Bakker (US 3634683) fails to disclose wherein the time-of-flight analyzer calculates the size or mass distribution by analyzing the beam current fall-off characteristics when the gas cluster ion beam is interrupted. Therefore, the claimed invention is not disclosed by the cited prior art.

**Referring to claims 5, 8, 17, and 20:** The most pertinent art Bakker (US 3634683) fails to disclose wherein the time-of-flight analyzer calculates the size or mass distribution by analyzing the beam current rise characteristics when the gas cluster ion beam is restored. Therefore, the claimed invention is not disclosed by the cited prior art.

**Referring to claim 32:** The most pertinent art Bakker (US 3634683) fails to disclose wherein the processing step further comprises the steps of: taking a derivative of the current

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transient after time  $t_0$  and dividing the derivative of the current transient by time  $t$  which is defined as the time required for the ion beam to travel along the predetermined length. Therefore, the claimed invention is not disclosed by the cited prior art.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (703)305-3342. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BARLOW can be reached on (703)308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3431 for regular communications and (703)305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

LN

March 21, 2003

  
John Barlow  
Supervisory Patent Examiner  
Technology Center 2800